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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,154	03/07/2006	Eberhard Kull	071308.0684	3421

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BAKER BOTTS L.L.P.  
PATENT DEPARTMENT  
98 SAN JACINTO BLVD., SUITE 1500  
AUSTIN, TX 78701-4039

EXAMINER
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HUFTY, JOHN PAGE

ART UNIT	PAPER NUMBER
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3747

MAIL DATE	DELIVERY MODE
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06/07/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/595,154

Applicant(s)

KULL, EBERHARD

Examiner

J. Page Hufty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04/10/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 04/10/2007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 7, 9 - 16, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann, U. S. Patent 4,296,887 in view Takeuchi U. S. Patent 4,566,316.

Hofmann teaches a sleeve which houses and protects an injection nozzle (fig 1, feature 20) resting against a cylinder head (feature 17), having a lower end assigned to the combustion chamber with an upper end having an annular flange (feature 21, claim 1) a sealing ring (feature 23; claim 3) the sleeve "guided to the edge area of the hole" (fig 1), constructed for heat protection or "making contamination more difficult" (column 1, line 5-10; claim 1).

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Hoffmann lacks a piezoelectric pressure sensor positioned between the sleeve and seal. However the use of these pressure sensors mounted in a cylinder head is well known in the art (see Takeuchi column 1, line 32-35). Takeuchi teaches the use of this type of sensor for the purpose of measuring pressure (column 1, line 5-8 and lines 35-40).

A person of ordinary skill in the art of fuel injection systems has an undergraduate degree in mechanical engineering or the equivalent from on the job experience, additionally this person is well aware of the need for combustion regulation, sealing concerns and available options for achieving these goals.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the sensor of Takeuchi with the sleeve of Hoffmann for the purpose of measuring cylinder pressure.

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Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman and Takeuchi as applied to claims 1 and 10 above, and further in view of Zabeck et al U. S. Patent 5,226,397. To the extent that Hoffman does not expressly teach a friction reducing coating Zabeck teaches the use of a friction reducing coating in contact areas for actuation (column 5, line 47 -57).

Therefore it would have been obvious to person of ordinary skill in the art as described above at the time of invention to combine the teachings of Zabeck with Hoffman and Takeuchi for ease of actuation of the sleeve.

### ***Response to Arguments***

Applicant's arguments filed 4/10/2007 have been fully considered but they are not found to be persuasive. Applicant's argument that the bushing 20 of Hofmann will not translate cylinder pressure is not found to be accurate by the examiner.

The sensor of Takeuchi is capable of reading cylinder pressure fluctuations translated through an engine's spark plug, which is securely threaded in the cylinder head (see Takeuchi fig. 5). The intense pressure of combustion in an engine's cylinder is still translated through the threaded spark plug mounting in spite of the sealing force of its secure threaded mounting in the cylinder head.

The sleeve 20 of Hofmann is similarly secured in the cylinder head, under the force of the clamping nut 24 and the mounting relation with the injector nozzle and sealing lip (Hofmann: features 10, 24). Though the actual movement will be small, the combustion pressure will still be translated through the sleeve 20 of Hofmann as the sleeve is subjected to the same intense pressure of combustion of the spark plug of Takeuchi.

Applicant's contention that measurable pressure translation will only occur if the sleeve 20 is modified to specifically provide translation is shown

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to not be the case, given the ability of the sensor of Takeuchi to measure the pressure fluctuations through a threaded down spark plug mounted in a cylinder head. It is therefore inherent to the structure of Hofmann that the sealing ring 23 will experience the force of combustion as translated through the sleeve 20.

Applicant concludes;

"Thus, Hoffmann expressly teaches that the sealing lip 22 firmly presses against the plug 10 so that the bushing 20 has not ability to translate between the plug 10 and the cylinder head 14."

This conclusion does not take into account the entire environment that the sleeve 20 of Hofmann exists in and the statement that Hofmann expressly teaches inability to translate is not the case. Nowhere in Hofmann is it expressly stated that the sleeve will not fluctuate or move slightly under the force of combustion. Rather Hofmann is addressing the general mounting procedure of his sleeve.

Applicant's statement regarding obviousness to combine states:

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A second premise of the invention is that it would have been obvious to combine the sensor of Takeuchi with the sleeve of Hoffmann for the purpose of measuring cylinder pressure. However, this premise also fails because, even if this combination could be made, it would not measure cylinder pressure. As noted above, the sealing lip 22 prevents the bushing 20 from translating between the plug 10 and the cylinder head 14 so that changes in cylinder pressure have no communication path to a sensor.

Again this argument is based on the premise that the sleeve 20 of Hofmann is unable to translate any fluctuation in pressure occurring in a cylinder that it is directly exposed to. Examiner for the reasons stated above takes the position that this is not the case and that there will be movement akin to that of the spark plug of Takeuchi, which however slight, is detectable for the purpose of generating a pressure reading.

Examiner therefore maintains rejections of claims 1-18 as proper.



***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Page Hufty whose telephone number is 571-272-9966. The examiner can normally be reached on 9:00 am - 5:00pm, Mon- Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen K. Cronin can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JPH

A handwritten signature in black ink, appearing to be 'JPH' followed by a stylized flourish.A handwritten signature in black ink, consisting of a stylized 'S' followed by a long horizontal line.

STEPHEN K. CRONIN  
SUPERVISORY PATENT EXAMINER